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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/682,850	10/24/2001	Kais Jameel Maayah	65.0323	9831
32588	7590	06/30/2005	EXAMINER	
APPLIED MATERIALS, INC. 2881 SCOTT BLVD. M/S 2061 SANTA CLARA, CA 95050			CHAWAN, SHEELA C	
			ART UNIT	PAPER NUMBER
			2625	

DATE MAILED: 06/30/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/682,850

Applicant(s)

MAAYAH ET AL.

Examiner

Sheela C. Chawan

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 07 April 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 5-7, 17- 26, 31- 38, 43- 47 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 5-7, 17- 26, 31- 38, 43- 47 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 07 April 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Response to Amendment***

1. Applicant's amendment filed on April 7, 2005 has been entered.

Claims 1-4, 8-16, 27-30 and 39- 42 are canceled.

Claims 5-7, 17- 26, 31-38 and 43-47 are pending in the application.

In response to applicant's submission of Replacement Drawings, specification, are accepted.

### ***Response to Arguments***

2. Applicant's arguments, see page 10 second paragraph lines 11-12, filed April 7, 2005, with respect to the rejection of claim(s) 1-15, 18-47, under 102(e) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Maeda et al., (US. 6,674,890 B2).

### ***Claim Rejections - 35 USC § 102***

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the

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effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 5 -7, 17 - 26, 31- 38, 43- 47 are rejected under 35 U.S.C. 102(e) as being anticipated by Maeda et al., (US. 6,674,890 B2).

As per claim 5, Maeda discloses a method for defect inspection of micro fabricated structures (note microfabricated structures corresponds to semiconductor wafer fig 1, 4) having repetitive (column 3, lines 33-35, fig 14, memory mat corresponds to repetitive regions) and non-repetitive regions (fig 14, 22 peripheral circuit corresponds to non-repetitive regions, column 1, line 28 through column 2, line 6), the method comprising:

- a). acquiring contrast data (column 4, lines 50- 55) from the micro fabricated structures (column 4, lines 50- 53);
- b). analyzing automatically the contrast data to find repetitive regions of the contrast data (column 1, line 28 through column 2, line 6. column 5, lines 51-58); and
- c). comparing the repetitive regions (fig 2, 14, column 5, lines 11-31) of the contrast data (fig 2, 12) with reference data to detect defects in the microfabricated structures, wherein the analyzing step includes creating at least one X-direction one-dimensional profile of a cell-metric of the contrast data (fig 12, differentiation in X direction) and at least one Y-direction one-dimensional profile of the cell-metric of the contrast data (fig 12, differentiation in Y direction) and thresholding the at least one X-direction one- dimensional profile and the at least one Y-direction one-dimensional

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profile to find the repetitive regions in the contrast data ( column 1, line 28 through column 2, line 6, column 8, lines 46- 61, 17- 42, column 8, line 64 through column 9, line 17 , column 9, lines 47 through column 10, line 3, column 10, line 63 through column 11, line 34).

As to claims 6, 26 and 38 Maeda discloses the method, wherein the reference data are repetitive cells in the repetitive regions (column 1, line 28 through column 2, line 6, column 8, lines 46- 61, 17- 42, column 8, line 64 through column 9, line 17, column 9, lines 47 through column 10, line 3, column 10, line 63 through column 11, line 34).

As to claim 7, Maeda discloses the method, further comprising finding non-repetitive regions in the contrast data and comparing the non-repetitive regions of the contrast data with non-repetitive reference data (column 1, line 28 through column 2, line 6, column 8, lines 46- 61, 17- 42, column 8, line 64 through column 9, line 17, column 9, lines 47 through column 10, line 3, column 10, line 63 through column 11, line 34).

As to claim 17, discloses the method wherein the analyzing step includes creating at least two X-direction one-dimensional profiles of a cell-metric of the contrast data and at least two Y-direction one-dimensional profiles of the cell-metric of the contrast data and thresholding the two X-direction one-dimensional profiles and the two or more Y-direction one-dimensional profile to find the repetitive regions in the contrast data (column 1, line 28 through column 2, line 6, column 8, lines 46- 61, 17- 42, column

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8, line 64 through column 9, line 17 , column 9, lines 47 through column 10, line 3, column 10, line 63 through column 11, line 34).

As to claim 18, 25, 31, 37 and 43, Maeda discloses the method wherein the acquiring contrast data step is performed with an e-beam inspection system (fig 18, 31 corresponds to electron beam, column 10, lines 37- 61).

As to claim 19, 35 and 47, Maeda discloses the method, further comprising reporting the defect data (column 8, lines 51- 61).

As to claim 20, 32 and 44, Maeda discloses the method, wherein the micro fabricated structures are on a semiconductor wafer (fig 1, 4 corresponds to semiconductor wafer).

As to claim 21, Maeda discloses the method wherein the comparing step further comprises arbitration comparison of the contrast data with at least two reference data sets (column 10, line 37 through column 11, line 67).

As to claims 22, 33 and 45 Maeda discloses the method, wherein the acquiring step comprises acquiring contrast data with an integer number of pixels across a single repeated cell of the microfabricated structure (column 12, lines 18- 20, fig 1, 11).

For claim 23, claim 23 recites similar limitation as claim 5 above and similarly analyzed. Maeda teaches the step of a) acquiring contrast data from the semiconductor wafer (fig 18 1 corresponds to semiconductor wafer), with an e-beam defect inspection system (fig 18, 31, corresponds to electron beam);

b). reporting the locations of the defects (column 8, lines 51-61).

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For claim 24, claim 24 recites similar limitation as claim 5 above and similarly analyzed. Maeda teaches the step of an XY stage disposed to support the microfabricated structures for inspection (column 10, lines 37- 61);

- a microscope and detector to acquire contrast data of the microfabricated structures (column 10, lines 36- 61, column 13, lines 60- 65);

an image computer (fig 18, 104 corresponds to computer which over all controls the system, column 13, lines 38- 65), equipped with stored program instructions for processing (note, the chip is subjected to the CMP process which is carried by steps or instruction) the contrast data to detect defects in the microfabricated structures, the processing comprising analyzing automatically the contrast data to find repetitive regions of the contrast data and comparing the repetitive regions with repetitive reference data to the detect defects in the microfabricated structures ( column 1, line 28 through column 2, line6, column 8, lines 46- 61, 17- 42, column 8, line 64 through column 9, line 17 , column 9, lines 47 through column 10, line 3, column 10, line 63 through column11, line 34).

As to claim 34 and 46, Maeda discloses the defect inspection system wherein the processing further comprises analyzing automatically the contrast data to find non-repetitive regions of the contrast data and comparing the non-repetitive regions with non-repetitive reference data to the detect defects in the microfabricated structures (fig 14 and 15, column 1, line 28 through column 2, line6, column 8, lines 46- 61, 17- 42, column 8, line 64 through column 9, line 17 , column 9, lines 47 through column 10, line 3, column 10, line 63 through column11, line 34).

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As to claim 36 see the rejection of claim 24 and claim 5 above.

***Other prior art cited***

4. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Noguchi et al., (US.6,411,377 B1) discloses optical apparatus for defect and particle size inspection.

Nara et al., (US. 6,759,655 B2) discloses inspection method, apparatus and system for circuit pattern.

Aloni et al., (US. 6, 360,005 B1) discloses apparatus and method for microscopic inspection of articles.

Lindow et al., (US. 4,748, 335) discloses method and apparatus for determining surface profiles.

Galbraith et al., (US. 5,276, 498) discloses adaptive spatial filter for surface inspection.




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**Contact Information**

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sheela C Chawan whose telephone number is. 571-272-7446. The examiner can normally be reached on Monday - Friday 7.30 - 4.00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bhavesh Mehta can be reached on 571-272-7453 . The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

✓   
Sheela Chawan  
Patent Examiner  
Group Art Unit 2625  
June 22, 2005